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with ENC_1 tips, the maximum error appears at the K_γ coefficient if $\gamma = -5^\circ$. The maximum error of the adimensional correction coefficients is smaller than that of the "n" exponent. The value of the nondimensional correction coefficients of the speed can be computed with an admissible error. c) Influence of feed and cutting depth on the speed; formulae for optimum economic speeds: Starting with the cutting speed formula:

$$v_T = \frac{C}{t^x\ s^y}\ K, \qquad (4),$$

in which v_T is the optimum cutting speed for an economical hardness T of the tool, m/min; t is the cutting depth, mm; s is the tool feed, mm/rev; C is the constant in function of the machined material; x and y are the exponents in function of the machined material; K is the overall correction coefficient of the speed, which has the following shape:

$$K = K_1,\ K_2,\ K_3,\ K_4,\ K_T,\ K_m,\ K_\gamma,\ K_\alpha,\ K_{\alpha 1},\ K_\chi,\ K_{\chi 1},\ K_\lambda, \qquad (5)$$

in which K_γ, K_α, $K_{\alpha 1}$, K_x, K_{x1}, K_λ are the geometrical correction coefficients in function of the angles γ, α, α_1, x, x_1, λ; K_1 is the correction coefficient in function of the mechanical characteristics of

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the machined material; K_2 is the correction coefficient in function of the used cooling system; K_3 is the correction coefficient in function of the sharpening mode of the tip; K_4 is the correction coefficient in function of the homogeneity of the strata; K_T is the correction coefficient in function of the economical hardness of the lathe tool; and K_m is the correction coefficient in function of the tip material; the authors establish the following formulae at the interval t = 0.1 - 3 mm and s = 0.1 - 0.8 mm/rev:

$$v_{60} = \frac{98.4}{t^{0.15}\ s^{0.38}} \qquad (7)$$

for "OL-60" steel machined with S_1 tip;

$$v_{60} = \frac{77.2}{t^{0.32}\ s^{0.43}} \qquad (8),$$

for "OL-70" Steel machined with S_1 tip;

$$v_{60} = \frac{93.1}{t^{0.17}\ s^{0.26}} \qquad (9),$$

Card 5/9 for "OL-60"steel machined with ENC_1 tip; and

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$$v_{60} = \frac{76.6}{t^{0.30}\ s^{0.27}} \qquad (10)$$

for "OL-70" steel machined with ENC_1 tip. To facilitate the calculations, the formulae (Nr 7, 8, 9, 10) can be represented by nomograms [Ref 3]. The optimum cutting speed of ENC_1 tips are lower than of S_1 tips. A comparing nomogram concerning only the feed is represented by (Figure 9). d) Influence of the cutting parameters on the effective power. Formulae for the determination of the machining power: Based on a general formula which comprises the influence of the different parameters of the optimum cutting conditions:

$$N = C_2 t^{x1}\ s^{y1}\ v^{z} \qquad (11),$$

in which N is the effective cutting power, kw; C_2 is the constant, in function of the machined material and other parameters comprised in the overall correction coefficient K; t is the cutting depth, mm; s is the tool feed, mm/rev; v is the machining speed, m/mm; x_1, y_1, z are the exponents in function of the machined material, the authors have determined the following formulae of the consumed effective cutting power:

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$$N = 0.0384\ t^{0.87}\ s^{0.73}\ v, \qquad (12)$$

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in case of "OL-60" steel machined with S_1 tip;

$$N = 0.0452\ t^{0.89}\ s^{0.68}\ v, \qquad (13),$$

in case of "OL-70" steel machined with S_1 tip;

$$N = 0.0387\ t^{0.93}\ s^{0.96}\ v, \qquad (14),$$

in case of "OL-60" steel machined with ENC_1 tip; and

$$N = 0.0387\ t^{0.89}\ s^{0.84}\ v, \qquad (15),$$

in case of "OL-70" steel machined with ENC_1 tip. A comparing of the consumed effective power in case of the machining of the same steel but with different tips, is presented by (Figure 10). All tips (S_1 and ENC_1) had a wear of: $\delta\alpha_1 < 0.4$ mm. Inserting the expressions of the optimum speeds given by the relations (Nr 7, 8, 9, 10) into the formulae of the effective power (Nr 12, 13, 14, 15), the authors have obtained the expressions of the effective power in case of machining with the optimum speed v_{60}:

$$Nv_{60} = 3.78\ s^{0.35}\ t^{0.72}, \qquad (16),$$

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in case of "OL-60" steel machined with S_1 tip;

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$$Nv_{60} = 3.58\ s^{0.70}\ t^{0.76}, \qquad (17),$$

in case of "OL-60" steel machined with ENC_1 tip;

$$Nv_{60} = 3.49\ s^{0.25}\ t^{0.57}, \qquad (18)$$

in case of "OL-70" steel machined with S_1 tip; and

$$Nv_{60} = 2.96\ s^{0.57}\ t^{0.59}, \qquad (19),$$

in case of "OL-70" steel machined with ENC_1 tip. In case of using nomograms, the respective K_1 speed correction coefficients have to be used if not all conditions are matched. Following the presented results based on approximately 4,000 experimental determinations made with two types of steel, the authors have drawn the following conclusions on the behavior of mineral ceramic tips, compared with steel tips: The hardness variation curves in function of the speed or cutting depth show the same behavior with both types of tips. The hardness variation law in function of the cutting speed keeps the same shape independently from the type of tip used. The general formulae (Nr 4 and 11) of the optimum cutting speed and of the consumed effective power of steel tips can also be extended upon the mineral

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ceramic tips because of their properties, but can be reduced by choosing a respective variation of the cutting parameters. Optimum working conditions with immediate practical use can be established for both types of tips. The wear of "ENC_1" mineral ceramic tips, increases faster than that of "S_1" steel tips, which leads to a reduction of the accuracy during long time machining. Based on this article the authors conclude that tools with steel tips could at least partially be replaced by tools with mineral ceramic tips.
There are: 14 graphs, 3 tables and 9 references, 4 of which are Rumanian, 3 Russian and 2 French.

SUBMITTED: July 7 , 1958

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DECIU, E.; POPOV, M.; MITRICA, I.

Centralizing installation of measurement of systems for the study of cutting machines and tools. p.923

STUDII SI CERCETARI DE MECHANICA APLICATA. Academia Republicii Populare Romine
Bucuresti, Rumania
Vol. 10, no.3, 1959

Monthly List of East European Accessions (EEAI) LC., Vol. 9, no.1, Jan. 1960
Uncl.

DECIU,E.:MITRICA,I:POPOV,M

Aspects of the scientific research in the field of metal cutting in Rumania
p.875

METALURGIA SI CONSTRUCIA DE MASINI. (Ministerul Industriei Metelurgice si Constrictiilor de Masins si Asociatia Stiintifica a Inginerilor Si Technicienilor din Rominia) Bucuresti, Rumania

Vol.11, no.10 Oct. 1959

Monthly list of East European Accessions (EEAI) LC Vol. 9, no.2 Feb. 1960

Uncl.

R/009/60/000/009/003/C08
A125/A026

AUTHORS: Popov, Mihail, Paul, Lecturer, Engineer, Candidate of Technical Sciences, Chief of Laboratory; Deciu, Eug., Engineer, Researcher; Mitrică, Ilie, Engineer, Researcher

TITLE: Use of Metal-Ceramic Tips in Lathe Work

PERIODICAL: Metalurgia şi Construcţia de Maşini, 1960, No. 9, pp. 796 - 801

TEXT: Subject article deals with metal-ceramic tips and presents some investigations conducted in many countries. Brief reference is made to the composition of metal-ceramic tips, their grinding and fastening to the shank. Isayev, Zorev and Kuchma (Ref. 1) have presented various possibilities of fastening metal-ceramic tips to the tool shank. The Rumanian INCERC has developed a metal-ceramic tip named ENC, which revealed good results. Experiments with ENC_1 tips regarding the optimum geometric elements, the best machining conditions, etc, have been conducted in the Laboratory of the Institutul de Mecanică Aplicată "Traian Vuia" (Institute of Applied Mechanics "Traian Vuia") of the Academia R.P.R. (Rumanian Academy), in cooperation with Engineer M. Calciu. The experiments have been conducted on "OL 60" and "OL 70" steels (STAS 500-49) in accordance with methods used at carbide tipped tools. The results have been presented in two previous papers (Refs.

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5 and 6). Subject article contains a part of the conclusions being of immediate importance to those who work with such tips. The plastic and elastic deformations occuring in the detaching zone of the shavings are very favorable. Thus, the same optimum geometry has been obtained with the ENC_1 tip having a hardness of HR_c = 65 - - 74 as with carbide tipped tools, when machining the same steel. The point of the tool was $r \approx 0.5$. The deviations from the optimum values of the cutting edge angles should not exceed $\pm 1^o$. Because of the initial shape of the ENC_1 tips, experiments with an end clearance $\varkappa = 45^o$ could be accomplished. Regarding the optimum machining conditions, a greater dispersion of results could be established with ENC_1 tips than with carbide tip. The economic cutting speed can be computed:

$$v_T = \frac{C}{t^x\ s^y} K \qquad (2)$$

in which v_T = economic speed for a durability of T, in m/mm; t = cutting depth in mm; s = feed in mm/rev; K = the overall correction factors. The useful power consumed can be computed with the formula $N = C_2\ t^{x1}\ s^{y1}\ v^z$ (kw), (3). The results obtained in machining "OL 60" and "OL 70" steels with ENC_1 tips are slightly below the results obtained with S_1 and $T_{15}\ K_6$ carbide tips, but are comparable with the results obtained with S_3 and $T_5\ K_{10}$ carbide tips. The results can be improved by lapping the tips, by using tool points with a greater radius (up to 2 mm), by ap-

Use of Metal-Ceramic Tips in Lathe Work

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A125/A026

plying a 0.2 mm wide chamfer along the cutting edge, using a better shank, improving the tip quality, etc. There are 5 figures, 3 tables, 1 photograph and 6 references: 2 Rumanian, 1 Soviet, 2 French and 1 German.

ASSOCIATION: Secţia de maşini şi mecanisme, Institutul de mecanică "Traian Vuia" (Section of Machines and Mechanisms, Institute of Applied Mechanics "Traian Vuia")

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R/008/60/000/004/012/018
A125/A126

AUTHORS: Popov, M. P., Mitrică, I., and Deciu, E.

TITLE: Wear resistance of cutting tools in function of their geometrical parameters

PERIODICAL: Studii şi Cercetări de Mecanică Aplicată, no. 4., 1960, 983 - 995

TEXT: Soviet workers, e.g., Bykov, Berkevich, and Kolesov, have developed excellent cutting tool geometries, matching the requirements of a high-speed cutting process. The chemical composition of the steel is very important for the determination of the machining ability. Starting from the development in the use of a cutting tool, the authors examine and determine the optimum geometric parameters in case of the machining of parts made of conventional, heat-treated carbon steels (STAS 500-59). The obtained relations furnish the connection between the geometrical parameter values and the mechanical characteristics, or, rather, the carbon contents of the steels submitted to the tests. Further, the authors examine the influence of the deviations from the optimum

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Wear resistance of cutting tools ....

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A125/A126

geometry on the durability of the tool. There are 6 figures, 4 tables and 6 Soviet-bloc references.

SUBMITTED: February 26, 1960

Card 2/2

POPOV, Mihai, ing.; DECIU, Eugen, ing.; MI'RICA, Ilie, ing.

Conditions for the economical steel splintering, required by STAS (state standard) 500-49. Metalurgia constr mas 13 no.10:873-879 O '61.

(Metal cutting) (Steel)

R/005/62/000/001/006/007
D272/D304

AUTHORS: Popov, M., Mitrică, I. and Deciu, N.

TITLE: The influence of the bevel and the rounding radius upon the wear of the cutting tool

PERIODICAL: Mecanică aplicată, 13, no. 1, 1962, 205-218

TEXT: Results are given of research undertaken at the Institutul de mecanica aplicată 'Traian Vuia' (Institute of Applied Mechanics 'Traian Vuia'). It was first determined that a bevel face along the main edge of the lathe cutting tool can reduce tool wear considerably, if it is realized with consideration of its two parameters -- its width $\underline{f}$ and its angle of inclination γ_f. Examination of the equilibrium of the plastic deformations in the cutting zone has indicated the existence of only one angle γ_f which renders maximal durability; a theoretical, as well as practical, investigation has indicated a close connection between γ_f and the principal placing

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angle α. Maximum durability is obtained when they are equal in value: $-\gamma_f = \alpha$. It was also determined that, in addition, higher durability is obtained in proportion to the difference between the optimum angle γ_f and the optimum raking angle γ_{opt}. It was next determined that the width f must absolutely be smaller than the plastic deformations on the cut in its zone of contact with the raking face, and best results are obtained if f = (2.5 - 2.9)a (where a is the width of the cut); as the zone of plastic deformations in the cut increases with increase of the cut width, it is possible to perform larger widths of the bevel. This bevel (along the main cutting edge) increases further the resistance to shocks and resistance to fragmentation of the edges. A rounding off of the tool tip was found to increase the durability of the tool in a manner similar to the main working angle $\varkappa$. As the length of the cutting edge in contact with the item material increases in proportion to the rounding radius, thus increasing the contact surface on the main placing face of the tool and reducing the specific pressures ✓

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on this contact surface, the wear will evidently be reduced. As in the case of φ the choice of the rounding-off radius r must depend on the rigidity of the system, recommending that the following limits are not exceeded: r = (2 - 4)s = (0.2 - 1)t (where s - the advancing rate in mm/turn and t - the depth of the cut in mm), when the durability of the tool can be increased by 30 - 80%, in proportion to r. There are 12 figures and 5 Soviet-bloc references.

SUBMITTED: July 29, 1961

POPOV, M.; MITRICA, I.; DECIU, E.

Turning Rumanian carbonaceous steel. Metalurgia constr mas 14 no.9:816-824 S '62.

1. Institutul de mecanica aplicata Traian Vuia.

POPOV, M. P.; MITRICA, I.; DECIU, E. D.

Study of the power necessary to the cutting of ordinary carbon steel. Studii cerc mec apl 11 no.6:1481-1495 '60.

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R/009/61/000/003/001/002
D015/D105

AUTHORS: Popov, M.P., Engineer, Instructor; Deciu, E. D., Engineer, Candidate of Technical Sciences, and Mitrica, I., Engineer

TITLE: Cutting characteristics of some Rumanian high-speed steels

PERIODICAL: Metalurgia şi Construcţia de Maşini, no. 3, 1961, 212-217

TEXT: The article deals with Rumanian standardized alloy steels used in tool making, and, in the light of recent specified requirements listed under STAS 3611-59, reviews problems and general conditions of domestic high-speed steels by analyzing and computing their cutting characteristics. The Institutul de Mecanică Aplicată "Traian Vuia" ("Traian Vuia" Institute of Applied Mechanics) of the Rumanian Academy conducted experiments on cutting operations using a lathe equipped with Rumanian high-speed-steel cutting-tools which were studied by M. Popov, I. Mitrică and E. Deciu (Ref. 1: Studii asupra parametrilor aşchierii cu cuţite de strung din oţel rapid romînesc. Studii şi cercetări de Mecanică Aplicată, X (1959), no. 2, pag. 539-564). The materials used in the tools were RW-180 and RMo-50 high-speed steels both manufactured and sub- X

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jected to heat treatment at the Uzinele "23 August" (Plant) in Bucharest. The RW-180 steel is composed of 0.76% C; 4% Cr; 19% W; 0.15% Mo and 1% V. The RMo-50 steel is a new product of the plant having molybdenum as the main alloying element and consisting of 0.84%C; 4.1% Cr; 5.4% W; 5% Mo and 1.64% V. The tool hardness was 63-65 Rc. The tools were sharpened by subjecting them to a roughing and a finishing operation. Rough grinding was carried out with artificial corundum with a ceramic bond having a J-K hardness and a 36-60 granulation. The finishing was carried out with silicon carbide with a ceramic bond having a K hardness and a 60 granulation. The tools had no groove or chamfer. The experiments with tools from RW-180 and RMo-50 steels were conducted on OL-38 carbon steel according to STAS 500-49 and on 35 MoCN 20 alloy steel. The samples made of OL-38 steel had δ_K = 39-46 kgf/sq mm. The analysis of 35 MoCN 20 steel samples showed the following composition: 0.36-0.39% C; 0.66-0.67% Mn; 0.70-0.80% Cr; 0.18-0.22% Mo; 1.80-1.90% Ni and δ_r = 67-73 kgf/sq mm. The experiments were carried out on cutting operation parameters as given by M. Popov, I. Mitrică, E. Deciu (Ref. 2: Aspecte ale cercetării ştiinţifice în domeniul

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aşchierii metalelor în R.P.R., Metalurgia şi Construcţia de Maşini XI, (1959), nr. 10, pag. 875-877). The optimum values of the side rake angles γ; side clearance angles α; front clearance angles α_1; secondary adjusting angles χ_1, and back rake angles λ were determined on the basis of geometrical parameters and are given in Table 1. They are also valid for tools made from RW-180 and RMo-50 steels. The numerical values of the relation between cutting speed and tool life were established by the equation

$$vT^n = C_1 \quad (1)$$

where v is the cutting speed in m/min and T, tool life in min. The variation of the relation between cutting speeds and tool life when cutting 35MoCN 20 steel with an RW-180 cutter is shown in Fig. 1 and when cutting OL-38 steel with an RMo-50 cutter in Fig. 2. The interpretation of these values shows that the exponent n is independent of speed, feed and cutting depth. The n_{med} values given in Table 2 calculated as an average of values obtained under

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different conditions are used for determining the speed-correction coefficients. The economical cutting speed is calculated from the formula

$$v_T = \frac{C}{t^x \cdot s^y} \cdot K \qquad (2)$$

where v_T is the cutting speed for the economical tool life T of the cutter in m/min; t, cutting depth in mm; s, feed in mm/revolution; C, constant in relation to the machined material; x and y, exponents in relation to the machined material and K, overall correction coefficient of the speed. The numerical values obtained are shown in Table 3 and are used in Eq. (2) for calculating the economical speed v_{60} for s = 0.1 - 1 mm/revolution and t = 0.5 - 6 mm. The overall correction coefficient of cutting speed is expressed by:

$$K=K_1 \cdot K_2 \cdot K_3 \cdot K_4 \cdot K_T \cdot K_m \cdot K_\gamma \cdot K_\alpha \cdot K_{\alpha_1} \cdot K_\chi \cdot K_{\chi_1} \cdot K_\lambda \qquad (3)$$

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where K_1 is the correction coefficient in relation to the mechanical properties of the machined material; K_2, correction coefficient in relation to the cooling system used; K_3, correction coefficient of the cutter in relation to the sharpening method; K_4, correction coefficient in relation to the homogeneity of the material, the presence of slag, etc. resulting from cold drawing; K_T, correction coefficient in relation to the economical tool life; K_m, correction coefficient in relation to the material of the cutter; and K_γ, K_α, K_{α_1}, K_χ, K_{χ_1}, K_λ, correction coefficients in relation to γ, α, α_1, χ, χ_1, and λ angles. The K_1 value was considered to be 1 for each type of steel used in the experiments. For cutting operations performed without cooling, it was taken that $K_2=1$, but $K_2 > 1$ with cooling. In case of sharpening mentioned above, it was considered that $K_3 = 1$; while with high-quality

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sharpening, $K_3 > 1$. By performing a groove and a chamfer on the main cutting edge, an increase of the economical speed was obtained, i.e. $K_3 > 1$. The values of the K_T coefficient are given in Table 4 and the values of the speed correction coefficients in relation to geometric parameters in Tables 5 to 9. The power required for the cutting process was determined from:

$$N=C_2 t^{x_1} \cdot s^{y_1} \cdot v^z \qquad (4)$$

where N is the cutting power in kw; C_2, constant in relation to the machined material and other parameters included in K, and x_1, y_1, z, exponents in relation to the machined material. Experimental numerical values from this equation are given in Table 10 showing that the values for tools made from the 2 types of high-speed steels, did not differ appreciably. Fig. 7 and 8

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show that lathe cutting tools made from RMo-50 steel make for higher economical speeds. A comparative analysis can also be made by using the K_m coefficient defined as

$$K_m = \frac{v_{60}^{RMo-50}}{v_{60}^{RW-180}} \qquad (5)$$

This shows that RW-180 tools are recommended for $K_m < 1$ and RMo-50 tools for $K_m > 1$. The results obtained by the I.M.A. laboratory were confirmed at the industrial level at the "23 August" Plant which tested many types of tools. The results proved that RMo-50 steel is cheaper than RW-180. Therefore, RMo-50 should be used for general purposes, such as lathe cutters, planing cutters, slotting cutters, milling cutters, etc. The RW-180 steel is recommended for tools which produce small chips, such as twist drills, screw-

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taps, reamers, formed milling-cutters, etc. The STAS 3611-59 standard also lists high-speed steels with cobalt as the main alloying element. These steels designated as RK-100 and RK-50 should be used for cutting-tools, especially, for cutters used in heavy machining at high speeds and in machining very hard steel. Cutters with steel-cobalt-alloy tips are better than cutters with carbide tips for the range of cutting speeds mentioned. The manufacture of high-speed steel tools should be based on the quality of high-speed steel, on the heat treatment, and the mechanical characteristics of the pieces to be machined. There are 10 figures, 10 tables, and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

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Fig. 1. Variation of the relation between tool life and speed in cutting 35 MoCN 20 steel with cutters made from RW-180 high-speed steel.

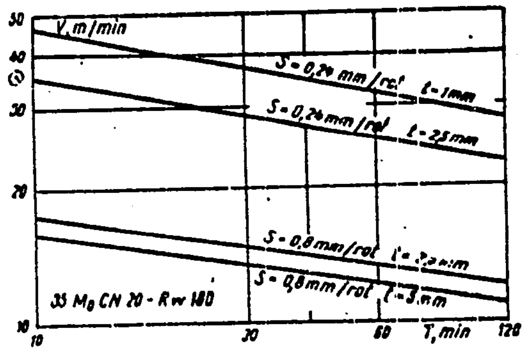

Fig. 1.

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Fig. 2. Variation of the relation between tool life and speed in cutting OL 38 steel with cutters made of RMo-50 high-speed steel.

Table 1. Legend: (1) Optimum values

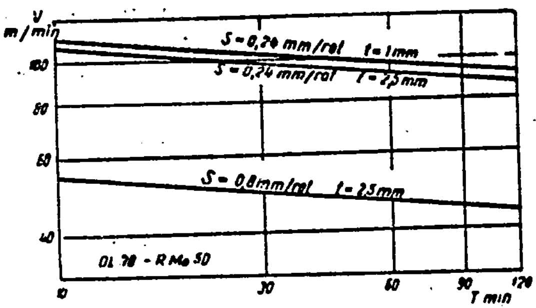

Fig. 2.

Unghiul optim (1)	γ	α	α_1	x_1	λ
OL-38	15 17°	11°	15°	10°	0°
35 MoCN 20	10°	11°	12°	10°	0°

Table 1.

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Table 2.

Legend: (1) Machined material; (2) RW-180 cutter; (3) RMo-50 cutter.

Materialul prelucrat	v_{med}	
	cuțit RW-180	cuțit RMo-50
OL 38	0,234	0,157
35MoCN 20	0,192	0,160

Table 2.

Table 3.

Legend: (1) Machined material; (2) Cutter material.

Materialul prelucrat	Materialul cuțitului	C	x	y
OL—38	RW—180	42,8	0,32	0,44
	RMo—50	50,9	0,30	0,51
35 Mo CN 20	RW—180	11,6	0,15	0,71
	RMo—50	10,5	0,08	0,85

Table 3.

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Table 4.

Legend: (1) Machined material; (2) Cutter material.

Materialul prelucrat	Materialul cuțitului	K_T		
		T = 60 min	T = 90 min	t = 120 min
OL 38	RW-180	1	0,01	0,85
	RMo-50	1	0,04	0,[illegible]0
35 MoCN 20	RW-180	1	0,93	0,90
	RMo-50	1	0,94	0,90

Table 5.

Legend: (1) Machined material; (2) Cutter material.

Materialul prelucrat	Materialul cuțitului	K_γ					
		γ=0°	5°	10°	15°	17°	20°
OL 38	RW-180	—	—	0,89	1	1	0,94
	RMo-50	—	—	0,98	1	1	0,93
35 MoCN 20	RW-180	0,97	0,90	1	0,98	—	—
	RMo-50	—	0,97	1	0,93	—	—

 Table 4. Table 5.

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Table 6.

Legend: (1) Machined material;
(2) Cutter material

Materialul prelucrat	Materialul cuțitului	K_{μ} $\alpha = 7°$	11°	14°30′
OL 38	RW–180	0,90	1	0,96
	RMo–50	0,99	1	0,94
35 MoCN 20	RMo–50	0,98	1	0,98

Table 7.

Legend: (1) Machined material;
(2) Cutter material

Materialul prelucrat	Materialul cuțitului	K_{α_1} $\alpha_1 = 10°$	12°	15°	18°	20°
OL 38	RW–180	0,83	—	1	—	0,88
	RMo–50	0,96	—	1	—	0,99
35 MoCN 20	RMo–50	0,90	1	0,98	0,77	—

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Table 8.

Legend: (1) Machined material;
(2) Cutter material

Materialul prelucrat	Materialul cuţitului	K_z			
		$\varkappa = 30°$	45°	60°	90°
OL 38	RW—180	1,40	1	—	0,72
	RMo—50	1,20	1	—	0,93
35 MoCN 20	RMo—50	1,09	1	0,94	0,84

Table 9.

Legend: (1) Machined material;
(2) Cutter material

Materialul prelucrat	Materialul cuţitului	K_{z_1}		
		$\varkappa_1 = 5°$	10°	15°
OL 38	RW—180	0,99	1	0,99
	RMo—50	0,97	1	0,94
35 MoCN 20	RMo—50	0,83	1	0,87

Card 14/16 Table 8. Table 9.

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Cutting characteristic of some Rumanian high-speed steels

Table 10.

Legend: (1) Machined material

Materialul prelucrat	C_v	x_1	y_1	n
OL-38	0,209	0,142	1,78	1
35 MoCN 20	0,0282	1,01	0,68	1

Fig. 7. Comparative nomogram for OL 38 steel. . .

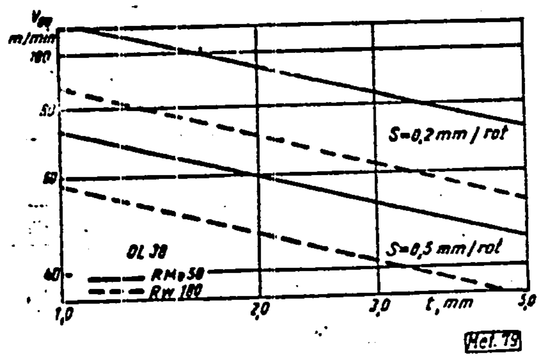

Fig. 7.

Card 15/16 Table 10.

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Cutting characteristic of some Rumanian high-speed steels

Fig. 8. Comparative nomogram for 35 Mo CN 20 steel.

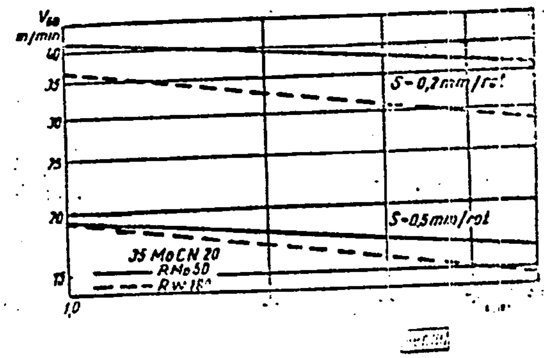

Fig. 8.

33741
R/008/61/000/006/004/005
D272/D304

14000

AUTHORS: Popov, M.P., Mitrică, I., and Deciu, E.D.

TITLE: The geometry of cutting tools for carbon steel processing

PERIODICAL: Studii si cercetări de mecanică aplicată, no. 6, 1961, 1357 - 1378

TEXT: The problem of the geometry of the turning cutting tool for processing ordinary heat treated carbon steels (STAS 500-49) and heat treated quality carbon steels (STAS 880-49) has been investigated in a series of tests performed at the "Institutul de mecanica aplicata - Traian Vuia" (Institute of Applied Mechanics) - Traian Vuia. The study is based on the evolution of wear with time up to the ceiling of wear δ_{α_1} = 1 mm on the secondary placing face, the results being presented by means of the correction coefficients of the durability - τ - which are dimensionless. The study was concentrated on the main angles of the active part of the turning cutting tool, namely the front rake angle γ, the main and secondary

X

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D272/D304

The geometry of cutting tools ...

placing angles α and α_1, the main and secondary working angles $\varkappa$ and $\varkappa_1$, and the inclination angle of the main cutting edge λ. A close relationship was found between the wear and the geometry of the 3 active faces, determining that the optimum contact surfaces -- which are defined as the initial surfaces corresponding to the optimum angles -- correspond to a distribution of the specific pressures resulting in the slowest destruction of the active faces. The front rake angle was found to depend on the intensity of the deformations originating in the cutting zone of the processed wear; thus a different front rake angle must be chosen for each type of steel processed if an optimum initial contact surface is desired. This is born out by empirical formulas (function of the ultimate tensile strength and function of the Brinell hardness). As the hardness depends on the carbon content it was possible to derive the dependence of the rake angle on the carbon content

$$\gamma = 71.43 \log \frac{0.805}{C + 0.278} \tag{7}$$

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The geometry of cutting tools ...

The latter formula is difficult to employ in practice and, therefore, the use of a table is suggested. Examination of the other cutting tool angles on nine steels of the above-mentioned two categories indicated the following optimum values - $\alpha = 11^\circ$, $\alpha_1 = 15^\circ$, $\varkappa = 45^\circ$, $\varkappa_1 = 10^\circ$, $\lambda \approx 0$. These values do not depend on the nature of the processed material in the case of the steels processed in this study. In the case of the main working angle there is no actual optimum value, as the tool durability is increased with the max. possible decrease of $\varkappa$, thus choosing the minimum value of $\varkappa$ for each respective profile processed, as well as for each rigidity of the processed item (higher rigidity enables smaller $\varkappa$). It was also established that at appropriate hardnesses the material of cutting tool does not affect the optimum angles. At 10-15 HRC units the deformations of the tool do not differ appreciably, and the initial optimum contact surfaces do not modify and the wear will be the slowest, as was demonstrated on a series of metal carbides and mineralo-ceramic materials. In addition to the size of the initial contact surface, its quality was found to have an appreciable effect

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The geometry of cutting tools ...

on the durability of the tool, and fine polishing enabled improved pressure distribution on the contact surfaces, resulting in slower wear. There are 16 figures and 17 Soviet-bloc references.

Card 4/4

POPOV, M.P.; MITRICA, I.; DECIU, E.D.

Geometry of the cutting tools for the processing to carbon steel. Studii cerc mec apl 12 no.6:1357-1378 '61.

POPOV, M. P., conf. ing.; DECIU, E. D., cand. st. tehn., ing.; MITRICA, I., ing.

Splintering qualities of some Rumanian high-speed steels. Metalurgia constr mas 13 no. 3: 212-217 Mr '61.

POPOV, M.P.; DECIU, E.D.; MITRICA, I.

Optimum economical conditions for the turning of carbon steel.
Studii cerc mec apl 13 no.4:1001-1120 '62.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECIU, E.D.

"Collection of technical hydraulic problems" by Dan Tasca, Ioan Bacanu. Reviewed by E.D. Deciu. Studii cerc mec apl 14 no.1: 259 '63.

POPOV, M.P.; MITRICA, I.; DECIU, E.D.

Influence of the clearance angle on the wear of cutting tools.
Studii cerc mec apl 14 no.3:641-649 '63.

POPOV, M. P., MITRICA, I., DECIU, E. D.

Influence of the angle of relief on the wear of cutting tools. Rev mec appl 8 no. 6: 1103-1110 '63.

POPOV, M. P.; DECIU, E. D.; MITRICA, I.

Transductor for force measurement. Studii cerc mec apl 14 no. 6: 1491-1496 '63.

POPOV, M.P., DECIU, E.D.; MITRICA, I.

Contributions to the calculation of radial losses in the case of fluid upsetting pumps and engines. Studii cerc mec apl 15 no.2:475-485 '64.

1. Submitted December 19, 1963.

HOLNAPY, Dezso, okleveles mernok; DECKER, Aladar, okleveles mernok

Cable railway safety device in case of deep fall. Banyaterv no.14:77-86 Ag '62.

DECKER, Ivan, dr.; HALMOS, Tamas, dr.

Pancreatectomy in hyperinsulinism. Magy.sebeszet 13 no.1: 54-58 F '60.

1. Budapest Fovaros Janos Korhaz es Rendelo Intezet (Igazgato: Tako Jozsef dr.) Sebeszeti osztalyanak (Foorvos: Gergely Rezso dr.) es I. Belgyogyaszati osztalyanak (Foorvos: Koranyi Andras dr.) kozlemenye.

(HYPERINSULINISM surg)
(PANCREAS surg)

DECKER, Ivan, dr.

Leiomyoma of the small intestine causing massive repeated hemorrhage. Orv. hetil. 102 no.14:650-651 2 Ap '61.

1. Janos Korhaz-Rendelointezet, Sebeszeti Osztaly, Budapest.

(LEIOMYOMA compl)
(INTESTINE SMALL neopl)
(HEMORRHAGE GASTROINTESTINAL etiol)

DECKER, M.

"Extraction of sand and gravel on the construction site of the electric-power plant in Opatovice." p. 130

POZEMNI STAVBY. Praha, Czechoslovakia, Vol. 7, No. 3, March, 1959

Monthly List of East European Accessions (EEAI), LC, Vol. 8, No. 9, September 1959.
Uncl.

DECKER, Milos, inz.

Operational techniques on the railway line with a long-distance dispatching safety device. Zel dop tech 10 no.7:201-204 '62.

DECKER, Milos, inz.

Basic and operational management. Zel dop tech 12 no.9: 232-233 '64.

1. Deputy Chief of the Administration of Jihozapadni draha.

DECKER, Miloslav, inz.; DOLEZEL, Radomir, inz.; BARTUSEK, Josef; KURKA, Jan, inz.

Universal multistoried assembled skeleton structure. Pozemni stavby 13 no.4:163-168 '65.

1. Prumstav, Pardubice (for all except Kurka). 2. Research Institute of Building Construction, Veseli nad Luznici (for Kurka).

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECKER, V.

"First Paper Mill in Slovakia." p. 77, Praha, Vol. 9, no. 3, Mar. 1954.

SO: East European Accessions List, Vol. 3, No. 9, September 1954, Lib. of Congress

DECKER, VILIAM

Nacrt dejin rucneho papiernictva na Slovensku. Martin, Matica slovenska, 1956. 80 p. (Outline of the history of paper manufacture in Slovakia. English, German, and Russian summaries. illus., fold. maps, bibl., facsims., indexes)

SO: Monthly Index of East European Accession (EEAI) LC, Vol. 7, No. 5, May 1958

COUNTRY : CZECHOSLOVAKIA H
CATEGORY : Chemical Technology. Chemical Products and Their Applications. Cellulose and Its *
ABS. JOUR. : RZKhim., No. 23 1959, No. 84359

AUTHOR : Decker, V.
INST. : -
TITLE : Manual Production of Asbestos Paper in Slovakia

ORIG. PUB. : Papir a celul., 1959, 14, No 3, 66-67

ABSTRACT : A historical review. The bibliography includes 6 titles. --D. Yakesh.

*Derivatives. Paper.

CARD: 1/1

DECKER, Viliam (Ruzomberok)

Watermarks of Kremnica paper mills. Papir a celulosa 17 no.11:255-257 N '62.

DECKER, Viliam (Ruzomberok)

Manufacturer's mark of Slovak papermakers in old times.
Papir a celulosa 18 no. 6: 130-132 Je '63.

DECKO, Drago, dr.

Pulmonary complications and recurrent exacerbation of specific pulmonary processes caused by balneotherapy. Reumatizam 13 no.1: 9-12 '66.

1. Bolnica za tuberkulozu, Topolsica.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECZKOWSKI, B.

Distr: 4E2c(j)/4E3d

Polymerization of α-olefins in the presence of solid catalysts. I. Wlodzimierz Dahlig, Stanislaw Berbeck and Bogdan Deczkowski. *Przemysl Chem.* 39, No. 2, 67-9 (1960).—Two series of polymerizations of $CH_2:CH_2$ were carried out in the presence of a catalyst contg. partially reduced CrO_3 on a carrier composed of 90% SiO_2 and 10% Al_2O_3, one for 3 hrs. at 300° and 20 atm. and the other for 3.5 hrs. at 135° and 20 atm. with some added O. The presence of O decreased the mol. wt. of polyethylene obtained from 70,000 to less than 30,000 and decreased the yield from about 18 to 5%. P. Dryjski

5
1-BW(BW)
2-JA)WB)(MAY)
2

4/1

BERBEC, Jan; DECOWSKA, Barbara

Bacterial wilt Pseudomonas solanacearum Smith) in the light of the literature. Rocz nauk roln rosl 81 no.4:829-843 '60.
(EEAI 10:9)

1. Z Centralnego Laboratorium Przemyslu Tytoniowego i Pracowni Hodowli i Uprawy Tytoniu IUNG w Pulawach.

(Tobacco) (Pseudomonas solanacearum)

DECOWSKI, EDWARD

14257* Working the Metal From the Rear Side of the Rolling Installation. **Kantowanie metalu z tylnej strony zniatacza.** (Polish.) Edward Decowski. *Wiadomości Hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 211-214. MG

Experiments in applying rolling force from both sides, i.e., alternately from the rear and the front, in the rolling of structural H-bars, show a reduction in the no. of passes and an improvement in the quality of the rolled metal. Diagrams, tables.

DECOWSKI, Edward

Working Rollers on Lathes (Podstawy Obroki Walcow Skrawaniem), Stalinogrod: Wydawnictwo Gornicze-Hutnicze, 1956.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, E.

"Podstawy obróbki walców skrawaniem" Principles of roller machining by cutting), by E. Decowski. Reported in New Books (Nowe Książki), No. 12, June 15, 1956.

DECOWSKI, Edward

13185* (Polish.) Mechanization of Forging Operations. Mechanizacja robót kuźniczych. Edward Decowski. *Wiadomości Hutnicze*, v. 12, no. 5, May 1956, p. 147-151.

Description of machines and methods for mechanizing cutting, loading, lifting, transporting, and the removing of forged or pressed pieces from the forging, stamping, or pressing machines.

Metal

1

3

7466* (Polish.) The Present Development of the Production of Ribbed, Concrete Reinforcing Rods. Dotychczasowe osiągnięcia w dziedzinie produkcji prętów żebrowanych do zbrojenia betonu. Edward Decowski. *Wiadomości Hutnicze*, v. 12, Dec. 1956, p. 380-386.

Present day methods of making reinforcing rods; quality of steel to be used; and the contours and material of the rolls for rolling the rods.

Decowski, E.

13149* (Polish.) The Calculation of Temperature Drop in Various Rolling Passes. Obliczanie spadku temperatur w poszczególnych przepustach. Edward Decowski. *Hutnik*, v. 23, no. 5, May 1956, p. 216-219.

Formulas for calculating heat losses in the rolling process include the following factors; heat loss due to heat radiation, convection currents, and the difference in temperature between rolls and hot metal, and heat produced during deformation of the metal in the rolls.

Metal

1

DECOWSKI, E.

A vibration-reducing chamfer on the front-rake edge. p.208.
(MECHANIK. Poland. Vol. 29, no. 6, June 1956.)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 7, July 1957. Uncl.

DECOWSKI, E.

A mill for the hot-rolling of gears. p. 76.
(MECHANIK. Poland, Vol. 30, no. 2, Feb. 1957)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 7, July 1957, Uncl.

DECOWSKI, E.

Machine for rolling balls for ball bearings and ball crushers. p. 157.
(Mechanik, Vol. 30, No. 4, Apr 1957, Warsaw, Poland)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957. Uncl.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, E.

TECHNOLOGY

PERIODICAL: MECHANIK, Vol. 31, no. 7, July 1958.

DECOWSKI, E. Equipment for the transportation, separation, crushing, baling, and annealing of scrap metal. p. 365.

Monthly List of East European Accessions (EEAI) LC Vol. 8, No. 4
April, 1959, Unclass.

POL/43-59-3-4/10

18(5)

AUTHOR: Decowski, Edward, Engineer

TITLE: Intensification of Rolling Process (Intensyfikacja procesu walcowania)

PERIODICAL: Wiadomosci hutnicze, 1959, Nr 3, pp 86-90 (Poland)

ABSTRACT: For a long period, the theory of Kirchberg, limiting the coefficient of the longation porcess of steel, considerably restrained the development of the steel rolling process. This theory was based on the fact that Kirchberg limited the process in order to prevent defects appearing on the surface of rolled metal. The Russian scientist Grum - Grzymajlo refuted this theory by carrying out many tests of metal rolling under pressures, which surpassed by 50% the admissible norm. The admissible norm depends on many factors: 1) chemical compound of rolled metal; 2) compression-strength of the rolling mill; 3) power of the driving motor; 4) conditions under which the rolling metal is grasped by the machine; 5) gaging of rolls; 6) claims made on the quality of the

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POL/43-59-3-4/10

Intensification of Rolling Process

products. In the article, tests of steel rolling are described (for instance in Gliwica) the influence of various factors, the application of higher pressure and its favorable consequences. Also the influence of the additional friction force of the grasping conditions, its practical utilization, and the equipment for forcing metal between two rolls are dealt with. For the purpose of intensifying the rolling process, a conference was held at the IMZ in Gliwica, on September 16-18, 1958, when the future of rolling metal at high pressure was discussed in detail. There are 9 graphs, 3 tables, 1 photograph and 8 references, 7 of which are Soviet and 1 Polish.

Card 2/2

25(1) POL/43-59-11/12-13/33

AUTHOR: Decowski, Edward, Engineer

TITLE: The Use of Repeaters in Rolling Angle Steel

PERIODICAL: Wiadomości hutnicze, 1959, Nr 11-12, pp 369-372 (Poland)

ABSTRACT: The article discusses the experience of Soviet rolling mill technicians in the use of repeaters and outlines the structural solutions involved in their use. Repeaters were used for the first time in 1908 in linear rolling mills. They cut down manual labor, increase production speed and work safety, hence cut down costs. The use of repeaters with straight profiles is comparatively simple. The matter becomes more complicated where rhomboid and oval shapes have to be achieved since the regulation and setting of the repeater is tricky, depending mainly on the accurate calculation of the angle of torsion. Recently this process has been simplified by introducing armatures equipped with roller bearings. In the Soviet Union it was not until 1956 that it was possible to use repeaters in

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The Use of Repeaters in Rolling Angle Steel

rolling angled shapes. The mechanism developed at the Dzierżyński metallurgical plant is shown in Fig 1, where the numbers 1 to 9, reading from left to right, refer to the following parts: torsion throttle, steering tube, steering groove, rim, funnel, torsion throttle, throttle armature, steering funnel, throttle. The author of this machine was Jacura, W.K. The repeater is welded. Fig 5 shows a closeup of the receiving funnel and Fig 2 gives details of the torsion throttle. This is the most important part of the machine, for upon its setting depends the accuracy of the angle of torsion. This is calculated from the formula:

$$\frac{a}{a_{total}} = \frac{1}{L}$$

where a = the angle sought, a_{total} = the angle of torsion on the way from the inlet to the torsion throttle up to the receiving throttle, 1 = the length

POL/43-59-11/12-13/33

The Use of Repeaters in Rolling Angle Steel

of that part of the throttle exerting torsion, L = the length of the total path of torsion from the beginning of torsion to the axis of the receiving rolling mill cage. Fig 3 shows the profile of an angle piece worked through the repeater shown in Fig 1. Fig 4 shows a similar repeater used at the Uzbek plant since 1956. There are 6 diagrams and 4 references, 2 of which are Polish and 2 Soviet.

Card 3/3

DECOWSKI, Edward, inz.

Labor mechanization in rail rimming. Wiad hut 16 no.2:41-43
F '60.

DECOWSKI, Edward, inz.

Hardening of cast-steel and cast-iron rollers. Wiad hut 16 no.11:334-341 N '60.

DECOWSKI, Edward, inz.

Rational rolling of zinc and its alooys. Rudy i metale
6 no.8:349-351 Ag '61.

DECOWSKI, Edward, inz.

Tube drawing on the free flying mandrel. Rudy i metale 6 no.6:269-274 Je '61.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, E.

Rolling of tape from metal powder. Rudy i metale 6 no.6:286-287 Je '61.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, Edward, inz.

The advancing phase of aluminum and magnesium alloys rolling process. Rudy i metale 6 no.11:478-484 '61.

(Aluminum alloys) (Magnesium alloys)
(Rolling(Metalwork)

P/043/62/000/003/001/001
D004/D101

AUTHOR: Decowski, Edward, Engineer

TITLE: Products rolled from powder metals

PERIODICAL: Wiadomości hutnicze, no. 3, 1962, 75-82

TEXT: The article is a summary of information derived chiefly from Soviet-bloc references on a powder metallurgy technique of manufacturing rolled products. The principles and basic formulae are explained and prospects in the manufacture of permeable materials pointed out. G.Y. Aksenov first developed the theoretical prerequisites of powder metal rolling. His formula for the thickness of a strip is:

$$h = \frac{R\alpha^2}{\lambda \cdot z-1}$$

α -- no slip angle; λ -- elongation coefficient; z -- ratio of strip density to loose powder density; R -- radius of cylinders. The formula for calculation of strip density is based on Y.M. Pavlov's reasoning about the constant volume of metal before and after the rolling pass:

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Products rolled from ... P/043/62/000/003/001/001
D004/D101

$$\gamma_t = \frac{\gamma p}{\lambda} (1 + \frac{D}{h}) \quad (1 - \cos\alpha)$$

γp -- specific gravity of loose powder; D -- diameter of cylinders; α -- no-slip angle. The new process ensures a final yield of 85 - 90% as compared with 30 - 60% in conventional ingot rolling. The personalities mentioned are: G.Y. Aksenov, A.N. Nikolayev, Y.M. Pavlov, and V.G. Khromov. There are 9 figures, 6 tables and 10 references: 8 Soviet-bloc, 1 non-Soviet-bloc and 1 unidentified.

Card 2/2

DECOWSKI, Edward

Instillations and rubber padded dies used in deep drawing processes. Pt.1. Proglemy proj hut maszyn 10 no.2:41-55 F '62.

1. Bipromet, Katowice.

DECOWSKI, Edward, inz.

Pressure and efficiency during the rolling of iron sections. Wiad hut 18 no.1:17-24 '62.

P/043/62/000/007/001/001
D001/D101

1,1300

AUTHOR: Decowski, Edward, Engineer

TITLE: Technological process and rolling mills employed in rolling powder metals

PERIODICAL: Wiadomości hutnicze, no. 7-8, 1962, 215-220

TEXT: The article is an outline of principles employed in rolling powder metal into strip and leans on Western and Soviet-bloc references. Basic data on 11 Soviet powder metal rolling mills is given in table form. An electromagnet has been devised (Ref. 2: Aksenov, G.Y.; Gershteyn, L.Y.; Semyanov, Yu.N., and Yuferov, A.M.: Patent no. 105704) to magnetize the rollers of a rolling mill and thus increase the no-slip angle. A method has been developed by Y.V. Fedorchenko and G.A. Vinogradov for the manufacture of cylindrical laminar cermet parts. To meet requirements for magnetic properties, L.Y. Gershteyn and Yu.N. Semyanov succeeded in producing strip with a magnetic permeability of 10,000 gauss/oersted and a magnetic field strength of 0.57 oersted. An example is given of sintered titanium strip

1/B

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for filters, whose porosity depends on sintering temperature and in turn affects its strength. V.Y. Blagin et al. (Ref. 11: Mekhanicheskiye svoystva i iznosostoykost' izdeliy iz zheleznogo poroshka zavoda Ministerstva chornoy metallurgii, 1955 /Mechanical properties and wear resistance of iron powder products made by a plant of the Ministry of Iron Metallurgy, 1955/) tested the properties of iron strip which proved to be suitable for anti-friction bearings. There are 6 tables and 15 figures.

VB

DECOWSKI, Edward, inz.

Sorbitizing, slowed-down cooling, and normalizing of rails. Wiad hut 15 no.1:18-23 Ja '59.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, Edward, inz.

Drawing of tubes from copper and copper alloys with the use of the floating mandrel. Rudy i metale 7 no.8:370-37[illegible] Ag '62.

DECOWSKI, ~~Edward,~~ inz.

Forged products made of metal chips. Wlad hutn 18 no.6:182-185 Je '62.

DECOWSKI, Edward, inz.

The technological process and rolling mills applied in powder rolling. Wiad hut 18 no.7/8:215-220 Jl-Ag '62.

DECOWSKI, Edward, inz.

Application of repeaters in the rolling of angle bars.
Wiad hut 15 no.11/12:369-372 N-D '59.

DEGOWSKI, E., inz.

Friction in plastic working of metals. Rudy i metale 6 no.9:420-423 S '61.

DEGOWSKI, Edward, inz.

Structure distortion of aluminum manganese alloys during the rolling process. Rudy i metale 6 no.10:436-441 0 '61.

DECOWSKI, Edward, inz.

Electroimpulsive annealing of copper wires. Rudy i metale 7 no.9:431 S '62.

DECOWSKI, Edward, inz.

Calculation of hot stretching rolling power. Rudy i metale 7 no.9:432 S '62.

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000309910016-2"

DECOWSKI, Edward, inz.

Impact extrusion of aluminum and copper semiproducts. Rudy i metale 7 no.11:527-529 N '62.

DRCOWSKI, Edward

Rubber in the sheet metal industry. Problem proj hut maszyn 10 no.7:211-215 Jl '62.

1. Bipromet, Katowice.